Asymptotic geometric phase and purity for phase qubit dispersively coupled to lossy LC circuit

A.-B.A. Mohameda, A.-S.F. Obada

Abstract:

Analytical descriptions of the geometric phases (GPs) for the total system and subsystems are studied for a current biased Josephson phase qubit strongly coupled to a lossy LC circuit in the dispersive limit. It is found that, the GP and purity depend on the damping parameter which leads to the phenomenon of GP death. Coherence parameter delays the phenomenon of a regular sequence of deaths and births of the GP. The asymptotic behavior of the GP and the purity for the qubit-LC resonator state closely follow that for the qubit state, but however, for the LC circuit these asymptotic values are equal to zero.

Keywords:

Geometric phase Dissipation Phase qubit

Published In:

Annals of Physics , ,